

# Photovoltaic Solar Cell Protection Schottky Rectifier

Ultra Low  $V_F = 0.30\text{ V}$  at  $I_F = 5\text{ A}$



## FEATURES

- Trench MOS Schottky technology
- Low forward voltage drop, low power losses
- High efficiency operation
- High forward surge capability
- Solder dip 275 °C max. 10 s, per JESD 22-B106
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT

## TYPICAL APPLICATIONS

For use in solar cell junction box as a bypass diode for protection, using DC forward current without reverse bias.

## MECHANICAL DATA

**Case:** DO-201AD

Molding compound meets UL 94 V-0 flammability rating  
Base P/N-E3 - RoHS-compliant, commercial grade

**Terminals:** Matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

E3 suffix meets JESD 201 class 1A whisker test

**Polarity:** Color band denotes cathode end

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	15 A
$V_{RRM}$	45 V
$I_{FSM}$	200 A
$V_F$ at $I_F = 15\text{ A}$	0.38 V
$T_{OP}$ max. (AC mode)	150 °C
$T_J$ max. (DC forward current)	200 °C
Package	DO-201AD
Diode variations	Single die

MAXIMUM RATINGS ( $T_A = 25\text{ °C}$ unless otherwise noted)			
PARAMETER	SYMBOL	VSB1545S	UNIT
Device marking code		V1545S	
Maximum repetitive peak reverse voltage	$V_{RRM}$	45	V
Maximum DC forward current (fig. 1, 2)	$I_{F(DC)}^{(1)}$	15	A
	$I_{F(DC)}^{(2)}$	7.0	
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load	$I_{FSM}$	200	A
Operating junction temperature range (AC mode)	$T_{OP}$	-40 to +150	°C
Junction temperature in DC forward current without reverse bias, $t \leq 1\text{ h}$	$T_J^{(3)}$	$\leq 200$	

### Notes

- (1) With heatsink
- (2) Without heatsink, free air
- (3) Meets the requirements of IEC 61215 ed. 2 bypass diode thermal test

<b>ELECTRICAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)						
PARAMETER	TEST CONDITIONS	SYMBOL	TYP.	MAX.	UNIT	
Instantaneous forward voltage	$I_F = 5.0\text{ A}$	$T_A = 25\text{ }^\circ\text{C}$	$V_F^{(1)}$	0.42	-	V
	$I_F = 7.5\text{ A}$			0.44	-	
	$I_F = 15\text{ A}$			0.48	0.59	
	$I_F = 5.0\text{ A}$	$T_A = 125\text{ }^\circ\text{C}$		0.30	-	
	$I_F = 7.5\text{ A}$			0.33	-	
	$I_F = 15\text{ A}$			0.38	0.46	
Reverse current	$V_R = 45\text{ V}$	$T_A = 25\text{ }^\circ\text{C}$	$I_R^{(2)}$	-	1000	$\mu\text{A}$
		$T_A = 125\text{ }^\circ\text{C}$		13.8	30	mA
Typical junction capacitance	4.0 V, 1 MHz	$C_J$	1995	-	pF	

**Notes**

- (1) Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle  
 (2) Pulse test: 40 ms pulse width

<b>THERMAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)			
PARAMETER	SYMBOL	VSB1545S	UNIT
Thermal resistance	$R_{\theta JA}^{(1)}$	45	$^\circ\text{C/W}$
	$R_{\theta JL}^{(1)}$	9	
Typical thermal resistance	$R_{\theta JL}^{(2)}$	4	$^\circ\text{C/W}$

**Notes**

- (1) Without heatsink, free air; units mounted on PCB with 2 mm x 2 mm copper pad areas at 9.5 mm lead length  
 (2) Leads clipped at 3 mm lead length from plastic body on 7.0 cm x 2.2 cm x 1.9 cm x 2 heatsink

<b>ORDERING INFORMATION</b> (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
VSB1545S-E3/54	1.20	54	1400	13" diameter paper tape and reel
VSB1545S-E3/73	1.20	73	1000	Ammo pack packaging

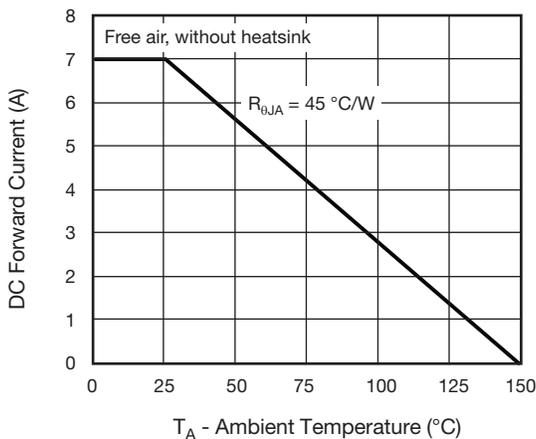
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^\circ\text{C}$  unless otherwise noted)


Fig. 1 - Forward Current Derating Curve

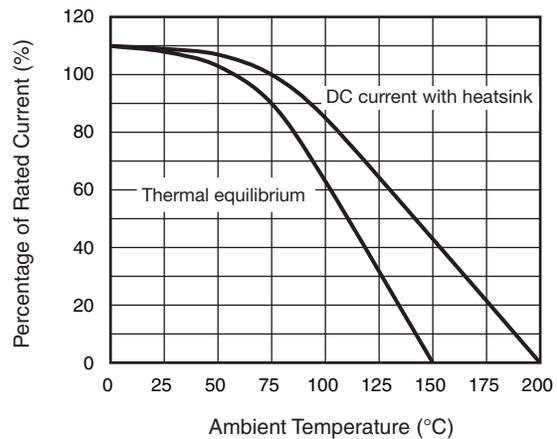


Fig. 2 - Rated Forward Current vs. Ambient Temperature

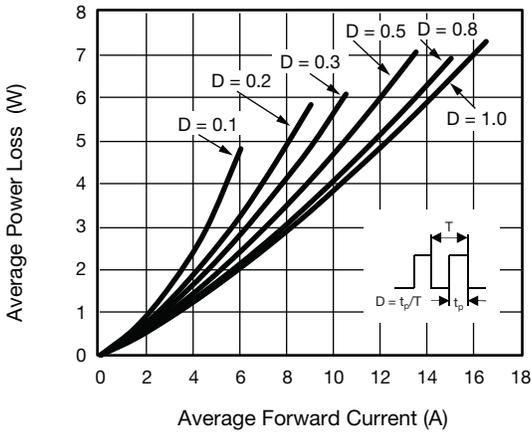


Fig. 3 - Forward Power Loss Characteristics

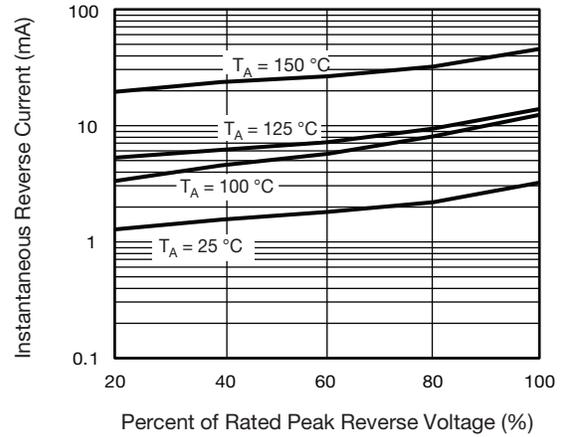


Fig. 5 - Typical Reverse Leakage Characteristics

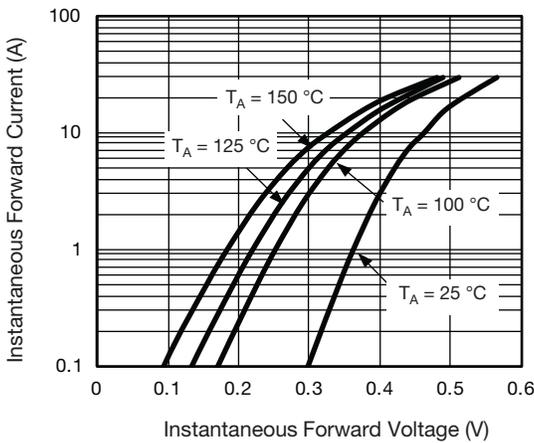


Fig. 4 - Typical Instantaneous Forward Characteristics

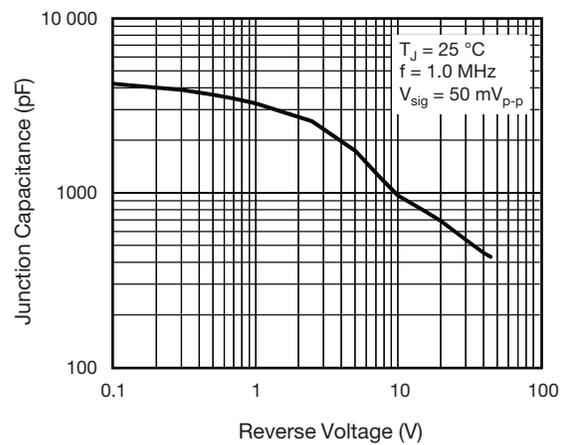
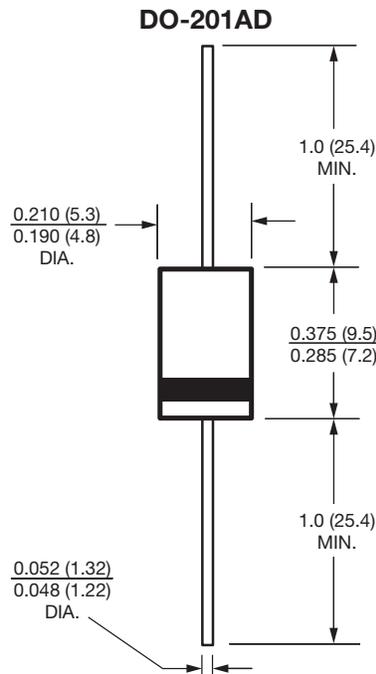


Fig. 6 - Typical Junction Capacitance

**PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)





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